

inflating tires of smaller diameter, the second outer seal ring is held in a raised position, with respect to the first inner seal ring, out of engagement with the side wall of the tire to be inflated. The second outer seal 72 is moveable with respect to the inner seal 70 by a plurality of inflatable chambers or any other suitable motors 80 disposed between the upper surface of the first inner seal ring, and the upper wall of a reciprocal housing supporting the second outer seal ring 72. An inflatable chamber 80 is also positioned between the upper surface of the reciprocal housing supporting the second seal ring 72 and the carriage 86 supporting the inflation head 68. This allows movement of the second seal ring 72 between a raised position and a lowered position with respect to the inner seal ring 70. When in the lowered position, the second outer seal ring 72 can be brought into engagement with the upper sidewall of a larger diameter tire to be inflated on a wheel rim by movement of the carriage 86 from the raised position to the lowered position. Due to the high forces existing during inflation of a tire on the wheel rim, it is necessary to hold the reciprocal housing supporting the second outer seal ring 72 in a fixed position relative to the vertically extending support guides. In order to achieve this, the vertically extending support guides or rods 84 include a narrowed diameter or groove or keyway recess adjacent a lower end operably engagable when the reciprocal housing supporting the second outer seal ring 72 is in the lowered position with respect to the first inner seal ring 70. When in this position, the plate 88 is rotated through a predetermined arc to bring reduced diameter key surfaces 94 into operable engagement with the grooves of the vertically extending rods 84 to lock the reciprocal housing supporting the second outer seal ring 72 in the lowered position against the forces present during the inflation process. The upper carriage 86 supporting the first inner seal ring 70 and second outer seal ring 72 for movement between the raised and lowered position is driven in reciprocation by two compressed air operated cylinders. A larger central hydraulic operated cylinder is used to lock the carriage in the desired position against the forces imposed during the inflation process.

The conveyor 12 according to the present invention can include a chain conveyor moveable between an upper position 20 and a lower position 22. When in the upper position, the chain conveyor moves a tire and wheel rim combination to the inflation work station. The central portion 24c of the pallet 24 is raised to an upper position and an actuator 66 drives outwardly rotatable arms 54 into engagement with the wheel rim in order to center the wheel rim and tire with respect to the central portion 24c of the pallet 24. After centering, the central portion 24c of the pallet 24 and conveyor 12 are moved into the lowered position. While being lowered, the outer peripheral portions 24a, 24b of the pallet 24 are moved radially inward toward one another to align complementary interlocking tongue and groove portions for engagement with the central portion 24c of the pallet 24. The tongue and groove portions of the central pallet 24c and outer portions 24a, 24b of the pallet 24 tie the pallet 24 together in order to resist the high forces imposed during the inflation process and in order to seal the pallet pieces with respect to one another so that a seal can be provided with respect to the lower surface of the tire to be inflated. After inflation, the chain conveyor can be raised to the upper position to remove the inflated tire from the inflation workstation, and to present an uninflated tire and wheel rim combination to the workstation to be processed.

While the invention has been described in connection with what is presently considered to be the most practical

and preferred embodiment, it is to be understood that the invention is not to be limited to the disclosed embodiments but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.

What is claimed is:

1. An apparatus for inflating a tire mounted on a rim comprising:

a conveyor for transporting a tire mounted on a rim to a predetermined position at a tire inflating workstation, the conveyor having carrier surfaces spaced laterally with respect to one another along a path of travel for engaging the tire and rim for transport, the carrier surfaces moveable along the path of travel and moveable vertically between a raised transport position and a lowered transfer position; and

a support surface at the tire inflating workstation, the support surface having at least two portions, the portions having at least one interlocking joint for holding the portions of the support surface in sealing engagement with respect to one another during an inflation process, at least one portion of the support surface moveable transversely with respect to the path of travel of the conveyor for allowing transfer of the tire and rim transported by the conveyor to the support surface as the conveyor moves between the raised transport position and the lowered transfer position.

2. The apparatus of claim 1 wherein the support surface further comprises:

a central portion and two end portions on opposite sides of the central portion, each end portion having an interlocking joint with respect to the central portion for holding the portions of the support surface in sealing engagement with respect to one another during an inflation process, each end portion moveable transversely toward and away from the central portion for allowing passage of the conveyor between the central portion and the end portions as the conveyor moves between the raised and lowered positions.

3. The apparatus of claim 2 further comprising:

the central portion moveable vertically between a locked position and an unlocked position with respect to the end portions; and

means for moving the central portion between the locked and unlocked positions.

4. The apparatus of claim 1 further comprising:

means for moving one portion of the support surface transversely with respect to the other portion of the support surface.

5. The apparatus of claim 1 further comprising:

one portion of the support surface moveable between a locked position and an unlocked position with respect to the other portion of the support surface; and means for moving the one portion between the locked and unlocked positions.

6. The apparatus of claim 1 wherein the conveyor further comprising:

two endless loop conveying surfaces spaced apart from one another and operably engagable with a drive shaft and an idler wheel;

a vertically reciprocal frame supporting the drive shaft and idler wheel, the frame moveable between the raised position and the lowered position; and

means for moving the frame between the raised and lowered positions.

7. The apparatus of claim 1 further comprising:

means for moving the carrier surfaces along the path of travel.

8. The apparatus of claim 1 further comprising:

means for communicating pressurized fluid to inflate the tire on the rim, the communicating means including a reciprocal inflation head moveable from a first position spaced from the tire to a second position engagable with a side wall of the tire, the head having at least two concentric seals selectively moveable with respect to one another to bring at least one seal into sealing engagement with a side wall of the tire; and

means for moving at least one seal with respect to the other seal for selectively presenting one seal in operable position for engaging a side wall of the tire to be inflated.

9. The apparatus of claim 8 wherein the inflation head further comprises:

a first circular wall extending outwardly from the inflation head and supporting a first seal corresponding to one of the at least two concentric seals for operable engagement with the side wall of the tire to be inflated; and

a second circular wall reciprocally mounted with respect to the inflation head for movement between an extended position and a retracted position, and supporting a second seal corresponding to another of the at least two concentric seals for operable engagement with the side wall of the tire to be inflated, the first seal positioned for operable engagement with a first size tire when the second circular wall is in the retracted position, and the second seal positioned for operable engagement with a second size tire when the second circular wall is in the extended position.

10. The apparatus of claim 9 wherein the first size tire is smaller than the second size tire.

11. The apparatus of claim 9 further comprising:

the moving means operable to move the second circular wall with respect to the first circular wall of the inflation head.

12. The apparatus of claim 9 further comprising:

means for locking the second circular wall with respect to the inflation head when the second circular wall is in the extended position.

13. The apparatus of claim 12 wherein the locking means further comprises:

a plurality of rods supporting the inflation head from a carriage for movement between the first and second positions, each rod having a keyway recess formed therein;

a plate operably connected to the second circular wall, the plate having a plurality of apertures formed therein for allowing passage of the plurality of rods, each aperture having an enlarged portion allowing free movement relative to the rod and a key portion operably engagable with the keyway recess in each rod when the second circular wall is in the extended position for locking the second circular wall with respect to the inflation head, the plate moveable to operably engage the key portion with respect to the keyway recess in each rod.

14. The apparatus of claim 13 further comprising:

means for moving the plate between an engaged position where the key portion of each aperture is engaged with the keyway recess of each rod and a disengaged posi-

tion where the enlarged portion of each aperture allows free movement of the plate with respect to the corresponding rod.

15. An apparatus for inflating a tire mounted on a rim comprising:

a reciprocal inflation head moveable from a first position spaced from the tire to a second position engagable with a side wall of the tire for communicating pressurized fluid to inflate the tire on the rim, the head having at least two concentric seals selectively moveable with respect to one another to independently bring each one of the at least two concentric seals selectively into sealing engagement with a side wall of the tire depending on the size of the tire to be inflated on the rim; and

means for moving at least one seal with respect to the other seal for selectively presenting an appropriate one of the at least two concentric seals in operable position for engaging a side wall of the tire to be inflated depending on the size of the tire to be inflated on the rim.

16. An apparatus for inflating a tire mounted on a rim comprising:

a reciprocal inflation head moveable from a first position spaced from the tire to a second position engagable with a side wall of the tire for communicating pressurized fluid to inflate the tire on the rim, the head having at least two concentric seals selectively moveable with respect to one another to bring an appropriate one of the at least two concentric seals selectively into sealing engagement with a side wall of the tire depending on the size of the tire to be inflated on the rim, wherein the inflation head includes a first circular wall extending outwardly from the inflation head and supporting a first seal corresponding to one of the at least two concentric seals for operable engagement with the side wall of the tire to be inflated, and a second circular wall reciprocally mounted with respect to the inflation head for movement between an extended position and a retracted position, and supporting a second seal corresponding to another of the at least two concentric seals for operable engagement with the side wall of the tire to be inflated, the first seal positioned for operable engagement with a first size tire when the second circular wall is in the retracted position, and the second seal positioned for operable engagement with a second size tire when the second circular wall is in the extended position; and

means for moving at least one seal with respect to the other seal for selectively presenting one of the at least two concentric seals in operable position for engaging a side wall of the tire to be inflated depending on the size of the tire to be inflated on the rim.

17. The apparatus of claim 16 wherein the first size tire is smaller than the second size tire.

18. The apparatus of claim 16 further comprising:

the moving means operable to move the second circular wall with respect to the first circular wall of the inflation head.

19. The apparatus of claim 16 further comprising:

means for locking the second circular wall with respect to the inflation head when the second circular wall is in the extended position.

20. The apparatus of claim 19 wherein the locking means further comprises:

a plurality of rods supporting the inflation head from a carriage for movement between the first and second positions, each rod having a keyway recess formed therein;

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a plate operably connected to the second circular wall, the plate having a plurality of apertures formed therein for allowing passage of the plurality of rods, each aperture having an enlarged portion allowing free movement relative to the rod and a key portion operably engagable with the keyway recess in each rod when the second circular wall is in the extended position for locking the second circular wall with respect to the inflation head, the plate moveable to operably engage the key portion with respect to the keyway recess in each rod.

21. The apparatus of claim 20 further comprising:

means for moving the plate between an engaged position where the key portion of each aperture is engaged with the keyway recess of each rod and a disengaged position where the enlarged portion of each aperture allows free movement of the plate with respect to the corresponding rod.

22. An apparatus for inflating a tire mounted on a rim comprising:

a reciprocal inflation head moveable from a first position spaced from the tire to a second position engagable with a side wall of the tire for communicating pressurized fluid to inflate the tire on the rim, the head having at least two concentric seals selectively moveable with respect to one another to bring an appropriate one of the at least two concentric seals selectively into sealing engagement with a side wall of the tire depending on the size of the tire to be inflated on the rim;

means for moving at least one seal with respect to the other seal for selectively presenting one of the at least two concentric seals in operable position for engaging a side wall of the tire to be inflated depending on the size of the tire to be inflated on the rim;

means for transporting a tire mounted on a rim to a predetermined position at a tire inflating workstation, the transporting means having carrier surfaces spaced laterally with respect to one another along a path of travel for engaging the tire and rim for transport, the carrier surfaces moveable along the path of travel and moveable vertically between a raised transport position and a lowered transfer position; and

a support surface at the tire inflating workstation, the support surface having at least two portions, the portions having at least one interlocking joint for holding the portions of the support surface in sealing engagement with respect to one another during an inflation process, at least one portion of the support surface moveable transversely with respect to the path of travel of the conveyor for allowing transfer of the tire and rim transported by the conveyor to the support surface as the conveyor moves between the raised transport position and the lowered transfer position.

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23. The apparatus of claim 22 wherein the support surface further comprises:

a central portion and two end portions on opposite sides of the central portion, each end portion having an interlocking joint with respect to the central portion for holding the portions of the support surface in sealing engagement with respect to one another during an inflation process, each end portion moveable transversely toward and away from the central portion for allowing passage of the conveyor between the central portion and the end portions as the conveyor moves between the raised and lowered positions.

24. The apparatus of claim 23 further comprising:

the central portion moveable vertically between a locked position and an unlocked position with respect to the end portions; and

means for moving the central portion between the locked and unlocked positions.

25. The apparatus of claim 22 further comprising:

means for moving one portion of the support surface transversely with respect to the other portion of the support surface.

26. The apparatus of claim 22 further comprising:

one portion of the support surface moveable between a locked position and an unlocked position with respect to the other portion of the support surface; and

means for moving the one portion between the locked and unlocked positions.

27. The apparatus of claim 22 wherein the transporting means further comprising:

two endless loop conveying surfaces spaced apart from one another and operably engagable with a drive shaft and an idler wheel;

a vertically reciprocal frame supporting the drive shaft and idler wheel, the frame moveable between the raised position and the lowered position; and

means for moving the frame between the raised and lowered positions.

28. The apparatus of claim 22 further comprising:

means for moving the carrier surfaces along the path of travel.

29. The apparatus of claim 1 further comprising:

the support surface having a plurality of upwardly extending concentric annular sealing flanges engagable with a lower side wall of a tire to be inflated.

30. The apparatus of claim 22 further comprising:

the support surface having a plurality of upwardly extending concentric annular sealing flanges engagable with a lower side wall of a tire to be inflated.

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